

REMARKS

Applicants are amending their claims in order to further define various aspects of the present invention. Specifically, Applicants are incorporating the subject matter of claim 8 into claim 1. In light thereof, Applicants are cancelling claims 7 and 8 without prejudice or disclaimer, and are amending dependencies of claims 9 and 11.

The concurrently filed RCE Transmittal is noted. It is respectfully submitted that the present amendments constitute the necessary Submission for such RCE Transmittal; and that, in view of the filing of the RCE Transmittal, entry of the present amendments is clearly proper notwithstanding the Finality of the Office Action mailed June 25, 2008, and the Advisory Action mailed October 9, 2008.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed June 25, 2008, that is, the teachings of the U.S. patent documents to Hata, et al., Patent No. 6,033,749, to Hille, et al., Patent No. 5,370,910, to Toyota, et al., Patent No. 6,815,467, to Kay, Patent No. 5,713,842, and to Ramanathan, et al., Patent Application Publication No. 2003/0044553, under the provisions of 35 USC 103.

It is respectfully submitted that these references as applied by the Examiner would have neither taught nor would have suggested such a fuel system as in the present claims, including, inter alia, a coating layer formed on the surfaces of at least one side of at least one of a fuel vessel body, a molded part body for a fuel and a tube body for a fuel or at least one of connected parts in these bodies, wherein the coating layer is formed by curing an urethane resin composition comprising an active hydrogen-containing compound (A) and an organic polyisocyanate compound (B), wherein the coating layer has a gasoline permeability coefficient of $0.2 \text{ g}\cdot\text{mm}/\text{m}^2\cdot\text{day}$

or less at 23°C and a relative humidity of 60% RH, wherein a skeletal structure represented by Formula (1) in claim 1 is contained in the coating layer, and this skeletal structure represented by Formula (1) accounts for at least 20% by weight thereof, and wherein the hydrogen-containing compound (A) comprises at least one compound selected from the group consisting of alkyleneoxide adducts of aroaliphatic polyamine, polyol adducts of aroaliphatic polyisocyanate compound, and aroaliphatic polyols. See claim 1.

As will be shown further in the following, it is respectfully submitted that these applied references do not disclose, nor would have suggested, the fuel system including, inter alia, the coating layer having the skeletal structure represented by Formula (1), formed using the specific hydrogen-containing compound as in claim 1, and with the amount of the skeletal structure represented by the Formula (1) as in claim 1, and advantages due thereto, or the gasoline permeability coefficient of the coating layer, and advantages thereof. Moreover, as discussed infra, as seen in the Declaration Under 37 CFR 1.132 submitted February 28, 2008, when the skeletal structure represented by Formula (1) in claim 1 is contained in the coating layer in an amount of at least 20% by weight, unexpectedly better results in reduced gasoline permeability coefficient are achieved, further supporting unobviousness of the presently claimed invention in claim 1, including amount of skeletal structure represented by this Formula (1).

As presently claimed, the coating layer is formed by curing an urethane resin composition comprising, in addition to the organic polyisocyanate compound (B), an active hydrogen-containing compound (A) comprising at least one compound selected from the group consisting of alkyleneoxide adducts of aroaliphatic polyamine, polyol adducts of aroaliphatic polyisocyanate compound, and aroaliphatic

polyols. As described in Applicants' specification at page 13, lines 16-21 (with respect to the alkyleneoxide adduct of aroaliphatic polyamine), page 14, lines 15-20 (with respect to the polyol adduct of aroaliphatic polyisocyanate compound) and page 15, lines 5-9 (with respect to the aroaliphatic polyol), the coating layer formed by curing an urethane resin composition including, in addition to the organic polyisocyanate compound (B), the specific active hydrogen-containing compound (A) selected from the group in present claim 1 achieves a higher gasoline barrier property even as compared with using other active hydrogen-containing compounds (A).

Furthermore, it is respectfully submitted that these applied references would have neither disclosed nor would have suggested such a fuel system as in the present claims, having features as discussed previously in connection with claim 1, and, moreover, wherein such skeletal structure represented by Formula (1), in the coating layer, accounts for at least 48% by weight thereof (see claim 22); and/or wherein the organic polyisocyanate compound (B) comprises a reaction product of (a) and (b), or a reaction product of (a), (b) and (c), as set forth in claim 12, especially wherein the polyfunctional isocyanate compound includes at least one compound selected from xylylenediisocyanate and derivatives thereof (see claim 13), in particular, wherein the polyfunctional isocyanate compound includes xylylenediisocyanate (see claim 14); and/or wherein the urethane resin composition has a ratio of isocyanate groups in the organic polyisocyanate compound to the sum of OH and amino groups in the active hydrogen-containing compound as in claim 20.

Moreover, it is respectfully submitted that these applied references would have neither taught nor would have suggested such fuel system as in the present claims, having features as discussed above in connection with claim 1, and,

moreover, wherein the thermoplastic resin (of the body of the recited structure) is at least one selected from those set forth in claims 3-6; and/or wherein the active hydrogen-containing compound (A) utilized in forming the coating layer has at least 3 active hydrogen atoms (see claim 19).

Furthermore, it is respectfully submitted that the teachings of the applied prior art would have neither disclosed nor would have suggested such fuel system as in the present claims, having features as discussed previously in connection with claim 1, and having additional features as in the remaining dependent claims, including (but not limited to) wherein the coating layer is formed on any surface of the inside and outside of the fuel vessel body at an area rate of 50-100% (see claim 16); and/or wherein the fuel system includes the fuel vessel with the coating layer formed on any surface of the inside and outside of the molded parts for a fuel (see claim 17), or formed on at least one of connected parts of the fuel vessel and the molded parts for a fuel (see claim 18); and/or wherein the coating layer has a thickness of 1-200 μm (see claim 21).

In addition, even assuming, arguendo, that the teachings of the references as applied by the Examiner would have established a prima facie case of obviousness, it is respectfully submitted that the Declaration of T. Koyama, one of the named inventors of the above-identified application, submitted with the Amendment filed February 28, 2008, shows unexpectedly better results achieved by the presently claimed invention, wherein the coating layer contains at least 20% by weight of the skeletal structure represented by Formula (1) in claim 1, overcoming any such prima facie case of obviousness and supporting a conclusion of unobviousness of the presently claimed invention.

The present invention relates to a fuel system comprising various parts, excellent in, inter alia, permeation-preventing performance against an automobile fuel (that is, having an excellent gasoline barrier property), heat resistance and impact resistance.

Recently, attention has turned to forming fuel vessels of a thermoplastic resin, in view of a reduction in weight, rust avoidance property, ease in mold processing, and recycling ability, in comparison with metal-made fuel vessels. However, there has been a problem that previous single-layer fuel vessels, made, for example, of polyethylene, have a relatively high gasoline permeability, so that gasoline is permeated and volatilized to the outside environment, through the fuel vessel body.

It has been proposed to provide a multilayer tank comprising, for example, polyethylene and an ethylene-vinyl alcohol copolymer; however, in view of recent environmental regulations, the gasoline barrier property thereof is not altogether satisfactory. Furthermore, in making such multilayer structures, problems arise in connection with forming a layer of a fuel-barrier material on, e.g., polyethylene, as described, for example, on pages 2-4 of Applicants' specification.

Against this background, and as a result of intensive investigations by the present inventors, Applicants provide a fuel system including a coating layer on at least one of a thermoplastic resin and a synthetic rubber, excellent in a gasoline barrier property, heat fusing property, and mechanical strength, wherein the coating layer can be formed evenly (so as to provide excellent gas-barrier properties, even in light of present environmental laws), which fuel system has good adhesion between the coating layer and fuel vessel body, and wherein the fuel system has good flexibility and bending resistance. Applicants have found that by utilizing a coating layer as in the present claims, formed by curing an urethane resin composition

comprising an active hydrogen-containing compound (A) and an organic polyisocyanate compound (B), wherein a skeletal structure represented by Formula (1) is contained in the coating layer formed by curing the urethane resin composition, and accounts for at least 20% by weight thereof, wherein the coating layer has a gasoline permeability coefficient of $0.2\text{g}\cdot\text{mm}/\text{m}^2\cdot\text{day}$ or less at 23°C and a relative humidity of 60%RH, and wherein the active hydrogen-containing compound (A) is selected from the specific group of compounds in claim 1, objectives according to the present invention are achieved. That is, as described in the paragraph bridging pages 22 and 23 of Applicants' specification, when the cured resin contains the backbone structure represented by Formula (1), and contains such backbone structure represented by Formula (1) in an amount of 20% by weight or higher, a high gasoline-barrier property can be exhibited, a high capability of preventing leakage of gasoline through the coating layer is achieved, and a good adhesion property between the fuel vessel body and molding parts or tube is achieved. Note also the second full paragraph on page 29 of Applicants' specification. The high gasoline-barrier property is even further improved when at least one of the specific active hydrogen-containing compounds (A) recited in claim 1 is used in forming the coating layer.

As to advantages achieved by the present invention, note the Examples in Applicants' original disclosure, starting from page 33 thereof; and note especially Tables 1 and 2 respectively on pages 35 and 37 of Applicants' specification.

It is respectfully submitted that the Declaration of T. Koyama, submitted with the Amendment filed February 28, 2008, further supports the conclusion of unobviousness of the presently claimed invention, particularly showing unexpectedly better results achieved where the coating layer is made from a urethane resin

composition comprising an active hydrogen-containing compound (A) and an organic polyisocyanate compound (B) as in the present claims, with the skeletal structure represented by Formula (1) accounting for 20% by weight or more of the coating layer. In particular, attention is respectfully directed to the "Procedures of Experiment" on pages 2 and 3 of this Declaration of T. Koyama. Note that Cases A-C (Examples 1-3, respectively) fall within the present invention, while Cases D-K (Reference Examples 1-8, respectively) fall outside the scope of the present invention. Note, in particular, that Reference Examples 1-8 use isocyanate compounds used in Examples in U.S. Patent No. 5,370,910 to Hille, et al., applied in rejecting claims in the Office Action mailed June 25, 2008. It is respectfully submitted that with respect to the coating layer, Hille, et al. is the closest prior art. Note that Reference Examples 1-4 investigated coating layers differing from materials of the coating layer according to the present invention in the polyisocyanate compound, with corresponding reduced amount of content of the skeletal structure of Formula (1) as compared to the amount recited in present claim 1; and Reference Examples 5-8 contained no content of the skeletal structure of this Formula (1). Note that a coating layer of material as in the present claims had greatly reduced gasoline permeability coefficient, as compared to both (a) coating layers of materials having some content of the skeletal structure of Formula (1) (see Reference Examples 1-4), but less than the amount recited in the present claims; and (b) coating layers of materials having no content of the skeletal structure of this Formula (1) (see Reference Examples 5-8).

Thus, note the difference in gasoline permeability coefficient according to the present invention, having content of skeletal structure of Formula (1) as in the present claims, in Examples 1-3 of this Declaration of T. Koyama, as compared with

gasoline permeability coefficients of layers in Reference Examples 1-4, having reduced content of skeletal structure of Formula (1), less than that in the present claims, and Reference Examples 5-8, having no content of skeletal structure of Formula (1). As stated under the heading "Consideration" on pages 3 and 4 of this Declaration, gasoline permeability coefficients were increased in Cases D-G (Reference Examples 1-4) which contain a small amount (less than 20% by weight) of the skeletal structure represented by Formula (1), and a large gasoline permeability coefficient occurred in Cases H-K (Reference Examples 5-8) which contain no skeletal structure represented by Formula (1), even though the coating layer comprised of the urethane resin composition included an active hydrogen-containing compound (A) and an organic polyisocyanate compound (B).

In addition, attention is again respectfully directed to Reference Examples 1-4 on page 3 of the aforementioned Declaration. These Reference Examples show that even where the content of the skeletal structure of Formula (1), in percent weight, increases from 6.7 to 8.2%, there is substantially no change in gasoline permeability coefficient. Especially in view of these Reference Examples 1-4, the unexpectedly better results achieved by the presently claimed invention, wherein the content of the skeletal structure of Formula (1) is at least 20% by weight, can be appreciated.

In the first paragraph on page 4 of the Advisory Action mailed October 9, 2008, the Examiner states that the Declaration submitted February 28, 2008 provides data for experiments in the Examples of Hille, et al., but that Hille, et al., is not limited to the examples; and that, furthermore, Hille, et al., "discloses the claimed polyurethane." Such contention by the Examiner that Hille, et al., discloses the claimed polyurethane is respectfully traversed, especially insofar as applicable to the claims as presently amended. Thus, and is discussed further infra, it is respectfully

submitted that Hille, et al., discloses a process for the production of a multi-coat protective and/or decorative coating on a substrate surface wherein, inter alia, polyols (D) containing at least three hydroxyl groups, preferably triols, are reacted with free isocyanate groups of the intermediate (Z) as described in column 3, lines 8-66, of Hille, et al. As to the polyol (D) containing at least three hydroxyl groups, note, for example, column 6, lines 53-56, disclosing that examples are trimethylolpropane, glycerol, erythritol, mesoerythritol, arabitol, and adonitol, among others. Example 1 in columns 11 and 12 of Hille, et al., disclose use of trimethylolpropane.

Thus, Applicants respectfully traverse the contention by the Examiner in the first paragraph on page 4 of the Advisory Action mailed October 9, 2008, that Hille, et al., “discloses the claimed polyurethane”, especially insofar as such contention relates to the claims as presently amended.

It is noted that the gasoline permeability coefficient (in $\text{g}\cdot\text{mm}/\text{m}^2\cdot\text{day}$) was measured in the experimental data in this Declaration by a gas phase method. In Examples of the present invention, the gasoline permeability coefficient is measured both by a gas phase method and a liquid phase method, as seen in Table 1 on page 35 of Applicants’ specification. By a gas phase method, the film is not brought into direct contact with gasoline, while by a liquid phase method, the film is brought into direct contact with gasoline. See page 32, lines 3-6 of Applicants’ specification. As can be seen from this Table 1, the gasoline permeability coefficient as determined by the liquid phase method is somewhat larger than that as determined by the gas phase method. However, it must be emphasized that in the Declaration submitted February 28, 2008, all of the results are consistently provided utilizing the gas phase method (not only referring to gasoline in the gas phase), and it is

respectfully submitted that this Declaration provides a fair comparison for gasoline permeability coefficient.

To emphasize, it is respectfully submitted that reference to the gas phase in the Declaration is to the method by which gasoline permeability coefficient was measured. It is respectfully submitted that the Declaration provides a fair comparison, with respect to different contents of the skeletal structure of Formula (1), for showing unexpectedly better results achieved according to the present invention having increased amount of content of the skeletal structure of Formula (1) in the coating layer, of at least 20% by weight, establishing unobviousness of the presently claimed subject matter, especially with respect to resins of Hille, et al.

Again, it is emphasized that the gas phase method is a proper test method for determining gasoline permeability coefficient of the polyurethane coating layer. In connection therewith, it is noted that, in general, a polyurethane film is permeable both to gasoline vapor and to liquid gasoline. In contrast, while a polyurethane film is permeable to water vapor, because the density and viscosity of water vapor is very small, polyurethane films are impermeable to liquid water because of increased viscosity thereof as compared to that of water vapor. Gasoline comprises a mixture of mainly many kinds of hydrocarbon, which have different vapor pressures and viscosities. Small amounts of the materials of the gasoline may penetrate in both the gas and liquid phase when a cap of polyurethane film is left standing for a long time under the environment of a temperature of 60°C, in determining gasoline permeability. The gasoline permeability coefficient of the liquid phase method may be somewhat larger than that of the gas phase method, because pressures to penetrate are increased with liquid gasoline, as compared with gasoline vapor. Thus, performance of gasoline in vapor or liquid, in permeating a polyurethane film,

is quite different from that of water in vapor or liquid form. It is respectfully submitted that the Declaration submitted February 28, 2008, provides a fair test in connection with gasoline permeability coefficient, showing unexpectedly better results achieved according to the present invention.

Please note that in the Declaration submitted February 28, 2008, an error exists in connection with Case A (Example 1). That is, the gasoline permeability coefficient therein should be $0.020 \text{ g}\cdot\text{mm}/\text{m}^2\cdot\text{day}$, consistent with Example 1 described on pages 33 and 34 of Applicants' specification, the results thereof being shown in Table 1 on page 35 of Applicants' specification. In any event, it is respectfully submitted that Examples 1-3 in the aforementioned Declaration (Cases A-C, respectively) show unexpectedly reduced gasoline permeability coefficient for structures within the scope of the present claims, establishing unobviousness of the present invention.

It is respectfully submitted that this Declaration establishes, as set forth in the paragraph bridging pages 3 and 4 thereof, that the gasoline permeability coefficient decreases advantageously and to an unexpectedly great degree by utilizing a coating layer containing the skeletal structure represented by Formula (1), in an amount of 20% by weight or more. It is respectfully submitted that, as stated in this Declaration, the content of the skeletal structure represented by Formula (1) in the urethane resin composition of the coating layer is very important, and a fuel system having excellent gasoline barrier property is not obtained when the urethane resin composition contains less than 20% by weight of skeletal structure represented by Formula (1), even though the coating layer is comprised of a urethane resin composition comprising an active hydrogen-containing compound (A) and an organic polyisocyanate compound (B).

Hata, et al. discloses an automobile fuel tank of multilayer construction, which includes (a) inner and outer layers of high-density polyethylene; (b) intermediate layers of adhesive resin; and (c) a core layer of ethylene-vinyl alcohol copolymer, wherein the total thickness of layers positioned inside the layer (c) is smaller than the total thickness of the layers positioned outside of the layer (c). See column 1, lines 8-11, and from column 1, line 66, through column 2, line 7. Note also column 2, lines 19-26, 49 and 50; and column 3, lines 4, 5, 16-22, 27-30 and 36-43. See also column 5, lines 9-12 and 22-25.

It is respectfully submitted that Hata, et al. discloses a fuel tank structure including, inter alia, a layer of ethylene-vinyl alcohol copolymer, and it is deficient in connection with presently claimed structure, with respect to, inter alia, a coating layer as in the present claims, and advantages thereof, or the gasoline permeability coefficient and advantages thereof. Specifically, Hata, et al. would have neither taught nor would have suggested structure including, among other features, wherein the coating layer includes the skeletal structure represented by Formula (1) in claim 1, and is formed using the specific active hydrogen-containing compound (A) as claimed in claim 1, or wherein this skeletal structure represented by Formula (1) accounts for at least 20% by weight thereof, or the gasoline permeability coefficient of the coating layer, among other features discussed in the foregoing, and advantages of these features.

It is respectfully submitted that the additional teachings of the secondary references applied by the Examiner would not have rectified the deficiencies of Hata, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Hille, et al. discloses a process for the production of multicoat protective and/or decorative coatings on substrate surfaces, and water-thinnable coating compositions based on polyurethane resins as film formers for the production of these coatings. The process for production of the multicoat protective and/or decorative coating is set forth most generally in column 3, lines 8-66.

Initially, it is respectfully submitted that the teachings of Hille, et al. would not have been properly combinable with the teachings of Hata, et al., absent hindsight use of Applicants' disclosure, which of course is improper under the guidelines of 35 USC 103. Thus, Hata, et al. is directed to a fuel tank, while Hille, et al. is directed to a base coat/clear coat process for forming protective and/or decorative coatings on substrate surfaces, such as coatings on automotive metallic finishes. Clearly, the protective and/or decorative coatings on, e.g., automotive finishes, described in Hille, et al., are for different structures than the fuel tank in Hata, et al.; and it is respectfully submitted that the structures formed in connection with Hata, et al., and Hille, et al., require different features. Moreover, note that the fuel tank of Hata, et al. describes an internal layer (core layer) of ethylene-vinyl alcohol polymer, with resistance to fuel permeation. Of course, such internal layer would not be relevant with respect to a decorative coating on substrate surfaces, or a multicoat protective layer on substrate surfaces. In view of different technologies involved in Hata, et al. and in Hille, et al., and different problems addressed by each, it is respectfully submitted that one of ordinary skill in the art concerned with in Hata, et al. would not have looked to the teachings of Hille, et al. In other words, it is respectfully submitted that these references are directed to non-analogous arts.

Moreover, noting that the present invention addresses the problem, inter alia, of a multilayer structure with good adhesion and physical properties, and resistance

to gasoline permeability, it is respectfully submitted that one of ordinary skill in the art involved in the present invention would not have looked to the teachings of Hille, et al. to solve the problem addressed by the present invention.

In addition, it is respectfully submitted that from the teachings of Hata, et al. and of Hille, et al. by themselves, and even in light of the teachings of the other applied references, and without hindsight use of Applicants' disclosure, there would have been no reason for combining teachings of Hata, et al. and of Hille, et al. as applied by the Examiner.

In any event, even assuming, arguendo, that the teachings of Hata, et al. and of Hille, et al. were properly combinable, and even in light of the teachings of the other references as applied by the Examiner, it is respectfully submitted that the combined teachings of these references would have neither disclosed nor would have suggested the coating layer, especially such coating layer including the skeletal structure represented by Formula (1), having been formed by curing an organic polyisocyanate compound (B) with the specific active hydrogen-containing compound (A) as in the present claims, and in an amount of the skeletal structure represented by the Formula (1) in the coating layer as in the present claims, and advantages thereof; and/or the gasoline permeability coefficient of the coating layer as in the present claims, and advantages thereof.

The contention by the Examiner in the first two paragraphs of Item 1 on page 2 of the Advisory Action mailed October 9, 2008, that Hille, et al., discloses the claimed polyurethane having 20% of the skeletal structure represented by Formula (1), is respectfully traversed, particularly insofar as applicable to the claims presently in the application. As discussed previously, it is respectfully submitted that Hille, et al., does not disclose, nor would have suggested, the active hydrogen-

containing compound (A) used in forming the coating layer as now recited in claim 1, and thus would not have disclosed or suggested the claimed coating layer of present claim 1. Thus, Hille, et al., would have neither taught nor would have suggested the coating layer containing at least 20% by weight of the skeletal structure of Formula (1).

In addition, it is respectfully submitted that Hille, et al. would not have taught, nor would have suggested, a coating having the gas permeability coefficient as in the present claims, contrary to the contention by the Examiner on this page 2 of the Advisory Action mailed October 9, 2008. Thus, the Examiner contends on page 2 that the recited permeability coefficient is inherent in Hille, et al. It is respectfully submitted, however, that the Declaration submitted with the Amendment filed February 28, 2008, shows that various materials within the scope of Hille, et al., would not have the recited gasoline permeability coefficient. Contrary to the contention by the Examiner, it is respectfully submitted that the Examiner has not established inherency in Hille, et al., for the claimed gasoline permeability coefficient.

Kay discloses a thin film wound dressing, to provide a sterile mechanical barrier to all types of infectious agents, the wound dressing having a first thin film layer that is impermeable to liquids and microbes but permeable to gasses and water vapor, and an adhesive second layer that is provided on the first layer, the adhesive layer also being permeable to gasses and water vapor, and a highly flexible release backing layer, which resists elongation, provided on the adhesive second layer. See column 3, lines 12-19 and 30-33. The Examiner has referred to column 8, lines 29-33, of Kay, describing that polyurethane films are preferred as the film layer because of their light transparency, permeability to gasses and water vapor and impermeability to liquids and microbes.

Initially, noting the differences in technology involved in Hata, et al. and Kay, and differences in problems addressed by each, it is respectfully submitted that Hata, et al. and Kay are directed to non-analogous arts and would not have been properly combinable. Moreover, again emphasizing differences in technologies and in problems addressed in Hata, et al. and Kay, it is respectfully submitted that no proper reason has been given for combining the teachings of Hata, et al. and Kay, even with the teachings of Hille, et al., absent hindsight use of Applicants' disclosure, which of course is improper under the guidelines of 35 USC 103.

Moreover, the disclosure in column 8, lines 29-33, of Kay, is again noted. This refers to impermeability to liquids and microbes, with permeability to gasses and water vapor, in connection with a wound dressing. As can be appreciated, gasoline easily volatilizes, yet must not permeate through structure as in the present invention, even as a gas. It is respectfully submitted that within the context of the wound dressing of Kay, the disclosure of this patent would have neither described nor suggested impermeability to gasoline; and, in any event, noting that Kay discloses permeability to gasses, it is respectfully submitted that this patent would have neither taught nor would have suggested the layer having the gasoline permeability coefficient as in the present claims, much less a coating layer containing the skeletal structure represented by Formula (1), in the amount thereof, and formed using the specific active hydrogen-containing compounds selected from the group in claim 1, and having the recited gasoline permeability coefficient.

The contention by the Examiner in the second paragraph on page 3 of the Office Action mailed June 25, 2008, that Kay teaches that polyurethane films are impermeable to liquids, the Examiner referring to column 8, lines 29-33 of Kay; and the conclusion therefrom by the Examiner that the coating taught by Hille, et al. "is

therefore impermeable to liquid”, is respectfully traversed. As indicated previously, Kay is directed to a wound dressing. Taking the teachings of this reference as a whole, including the portion thereof referred to by the Examiner, it is respectfully submitted that this reference is referring to permeability to gasses and water vapor, and impermeability to liquids such as sweat, not gasoline. As discussed in the foregoing, liquid gasoline (or gasoline vapor) has a different action with respect to permeability through polyurethane, as compared with water liquid and water vapor. It is respectfully submitted that the teachings of Kay, even together with the teachings of the other references as applied by the Examiner, would have neither disclosed nor would have suggested impermeability of the coating taught by Hille, et al. to gasoline (whether in gaseous or liquid form). Furthermore, even in light of the teachings of Kay, it is respectfully submitted that the teachings of the references applied by the Examiner would have neither disclosed nor would have suggested the coating layer formed by curing an urethane resin composition including an organic polyisocyanate compound (B) and the specific active hydrogen-containing compound (A) selected from the group set forth in claim 1, and having the skeletal structure of Formula (1), in the amount of 20% by weight or more, as in the present claims, and unexpectedly better results achieved thereby.

In the second paragraph of Item 2, on page 2 of the Office Action mailed June 25, 2008, the Examiner acknowledges that Hata, et al. fails to disclose a resin which is a coating layer having, inter alia, “the claimed structure in the amount of 20% by weight or more”; but does not point to any reference which would have disclosed or suggested the coating layer having the claimed structure in the amount of 20% by weight or more, other than contending that such amount would have been inherent in Hille, et al. As shown herein, the amount would not have been inherent in

the teachings of Hille, et al. Even as alleged by the Examiner in the Office Action mailed June 25, 2008, the Examiner has not established a prima facie case of obviousness, pointing to no reference, of the references applied in Item 2 on pages 2 and 3 of the Office Action mailed June 25, 2008, which, either alone or in combination, would have disclosed or suggested wherein the coating layer has the claimed structure of Formula (1) in the amount of 20% by weight or more.

The contention by the Examiner in lines 2-5 on page 3 of the Office Action mailed June 25, 2008, that one of ordinary skill in the art would have recognized the advantage of providing for the composition of Hille, et al. in Hata, et al., as both are directed to automobile parts, is respectfully traversed. Again, it is emphasized that Hille, et al. is directed to a protective and/or decorative coating on a substrate surface, while Hata, et al. is directed to a fuel tank of multi-layer construction with a core layer of ethylene-vinyl alcohol copolymer. It is respectfully submitted that one concerned with fuel tanks as in Hata, et al., would not have looked to the protective and/or decorative coatings on substrate surfaces as in Hille, et al.

It is noted that the Examiner, in the first full paragraph on page 3 of the Office Action mailed June 25, 2008, contends that while Hille, et al. does not teach a gasoline coefficient as in the present claims, Kay teaches that polyurethane films are impermeable to liquids, and thus the coating taught by Hille, et al. has a gasoline permeability coefficient of $0.2 \text{ g}\cdot\text{mm}/\text{m}^2\cdot\text{day}$ or less at 23°C and the relative humidity of 60%RH, as the coating taught by Hille, et al. would be impermeable to liquid in view of the teachings of Kay. However, as discussed previously, taking the teachings of Kay as a whole, this reference teaches the films being impermeable to liquids such as sweat, not gasoline. As is clear from the aforementioned Declaration submitted February 28, 2008, the coating taught by Hille, et al. is not impermeable to

gasoline, thereby refuting the basis by the Examiner in the Office Action mailed June 25, 2008, for the conclusion by the Examiner that the coating of Hille, et al. has a gasoline permeability coefficient within the scope of the present claims.

Noting that claims 8-14 have been rejected utilizing the additional teachings of Toyota, et al. (see Item 4 on pages 5 and 6 of the Office Action dated mailed June 25, 2008), this reference discloses methods for producing a polyoxyalkylene polyol and a polymer dispersed polyol, the method for producing the polyoxyalkylene polyol being described most generally in column 2, lines 45-65. Note also column 7 of this patent, disclosing that the polyol and the polymer dispersed polyol are widely used as a material of a flexible foam, an elastomer, a synthetic resin, a coating and a sealing material, or as a surfactant, a lubricant, a diluent, a plasticizer, etc. Note column 7, lines 39-47. See also column 9, lines 39-43.

It is respectfully submitted that the teachings of Toyota, et al. would not have been properly combinable with the teachings of Hata, et al., Hille, et al. and Kay, as applied by the Examiner. Thus, it is emphasized that Toyota, et al. is concerned with providing a specified polyol and polymer dispersed polyol, useful, for example, as a flexible foam, being disclosed as useful as, e.g., a cushion, a mattress or a seat, particularly suitable as a seat for vehicles such as automobiles (note again column 9, lines 39-43, of Toyota, et al.). Noting the relatively harsh conditions of a fuel tank, including contact with fuel (e.g., gasoline), it is respectfully submitted that one of ordinary skill in the art concerned with in Hata, et al. would not have looked to the teachings of Toyota, et al. That is, these references are directed to non-analogous arts.

Noting the different structures described in Hata, et al., on the one hand, and in Toyota, et al., on the other, it is respectfully submitted that there would have been

no reason for combining the teachings of Hata, et al. and of Toyota, et al., as applied by the Examiner, even in light of the teachings of Hille, et al. and Kay, absent hindsight use of Applicants' disclosure, which use of course is improper under the guidelines of 35 USC 103.

Even assuming, arguendo, that the teachings of Hata, et al., Hille, et al. Kay and Toyota, et al., as applied by the Examiner, were properly combinable, it is respectfully submitted that the combined teachings of these references would have neither disclosed nor would have suggested the presently claimed structure, including wherein the skeletal structure represented by Formula (1) is contained in the coating layer, and is contained in an amount accounting for 20% by weight or more, and advantages thereof as discussed in the foregoing; or wherein the coating layer is formed using an active hydrogen-containing compound selected from the group set forth in claim 1, and advantages thereof; or the gasoline permeability coefficient, and advantages thereof.

The Examiner, in the paragraph bridging pages 5 and 6 of the Office Action mailed November 28, 2007, has referenced column 14, lines 60-65, of Toyota, et al., as teaching an urethane comprising an active hydrogen-containing compound including an alkyleneoxide adduct of xylylenediamine in which the alkyleneoxide has 2-4 carbon atoms (the Examiner also referring to column 8, lines 66-67, and column 9, lines 12-14). Column 14, lines 60-65, of Toyota, et al. discloses a flexible polyurethane foam. Moreover, the portions of columns 8 and 9 referred to by the Examiner list examples (that is, many examples) of functional groups having active hydrogen. It is respectfully submitted that such teachings of Toyota, et al., particularly noting the uses of the polyol and polymer dispersed polyol of Toyota, et al., even in light of the teachings of Hata, et al., would not have led one to combine

the teachings of Toyota, et al. with Hata, et al., with or without the teachings of Hille, et al. and Kay; and, more particularly, would have neither disclosed nor would have suggested such fuel system as in the present claims, having the coating layer of the present claims, with the amount of the skeletal structure of Formula (1), or the gasoline permeability coefficient, or formed using the active hydrogen-containing compound, and advantages thereof as discussed in the foregoing.

In connection with claims 5 and 6, and noting the rejection set forth in Item 3 on page 4 of the Office Action mailed June 25, 2008, Ramanathan, et al. discloses a fuel tank including two or more sections bonded together by means of an adhesive which has a fuel barrier property and which bonds to low energy surface materials, as described in paragraph [0016] on page 1 of this patent document. Note also paragraph [0001] on page 1. Note, further, paragraph [0031] on page 2, disclosing polymers having fuel barrier properties which can be employed in the fuel tank described in this patent document. Note also paragraph [0036] on page 3, disclosing preferred adhesives.

Even assuming, arguendo, that the teachings of Ramanathan, et al. were properly combinable with the teachings of Hata, et al., Hille, et al. and Kay, such combined teachings would have neither disclosed nor would have suggested the presently claimed fuel system, including, inter alia, the coating layer as in the present claims, having the specified skeletal structure and in the specified amount, or formed using the active hydrogen-containing compound selected from the group in claim 1, or the gasoline permeability coefficient, and advantages thereof.

In addition, it is emphasized that while Ramanathan, et al. discloses various polymers having fuel barrier properties, for example, in paragraph [0031] on page 2, this patent document does not disclose polyurethane resin as a fuel barrier polymer.

Even utilizing the teachings of Ramanathan, et al. together with the teachings of the other references as applied by the Examiner, such combined teachings would have neither disclosed nor would have suggested the presently claimed invention, including the coating layer of the fuel system, formed by curing the specified compounds (A) and (B), having a skeletal structure represented by Formula (1), and wherein this skeletal structure accounts for 20% by weight or more, or the gasoline permeability coefficient of the coating layer.

Furthermore, attention is again respectfully directed to the Declaration submitted February 28, 2008. Again, it is respectfully submitted that this Declaration shows unexpectedly better results of gasoline barrier properties for a fuel system as in the present claims, including amount of skeletal structure represented by Formula (1) contained in the coating layer, and shows unexpectedly better results in reduced gasoline permeability coefficient of a coating layer as in the present claims; and, moreover, shows that a coating layer of material as in Hille, et al. would not inherently have a gasoline permeability coefficient as in the present claims.

The contention by the Examiner in the second paragraph of Item 5, on page 6 of the Office Action mailed June 25, 2008, that Hille, et al. is not limited to metallic finishes, and, furthermore, a fuel tank is clearly a component of an automotive structure, is noted. It must be emphasized, however, that Hille, et al. is directed to protective and/or decorative coatings on substrate surfaces, providing anticorrosive characteristics. Such disclosure would have neither taught nor would have suggested, either alone or in combination with the teachings of the other applied references, a film thereof for a fuel tank as in Hata, et al., particularly noting that in the fuel tank of Hata, et al. a core layer of ethylene-vinyl alcohol copolymer is utilized to provide barrier properties for gasoline.

Applicants respectfully request that the Examiner contact the undersigned to schedule and conduct an interview prior to a further Office Action on the merits in the above-identified application. The Examiner is thanked in advance for complying with this request.

In view of the foregoing comments and amendments, and in light of the concurrently filed RCE Transmittal, entry of the present amendments, contacting the undersigned to schedule an interview in the above-identified application, and subsequent to such interview, reconsideration and allowance of all claims pending in the above-identified application, are respectfully requested.

Applicants request any shortage in fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 396.43174X00), and credit any excess payment of fees to such Deposit Account.

Respectfully submitted,

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